

IN THE CLAIMS (as amended During International Preliminary Examination):

Please amend the claims as follows:

1. (Currently Amended) A method for ~~the production of~~ producing a serial connection of solar cells having integrated semiconductor elements, ~~characterized by the following features comprising the steps of:~~

~~incorporation of~~ incorporating one or more conductive elements (20) into an insulating support layer (10) ~~according to~~ in a pattern, whereby the conductive elements (20) protrude from the surface of the support layer on at least one side of the support layer, and the pattern ~~calls for~~ defines at least one separation line (21) having a width B and ~~consisting of~~ comprising at least one or more conductive elements (20);

~~incorporation of several~~ incorporating a plurality of spherical or grain-shaped semiconductor elements (30) into the insulating support layer (10) according to a pattern, whereby the semiconductor elements (30) ~~consist of~~ comprise substrate cores that are coated at least with one conductive back contact layer made of molybdenum and with one semiconductor layer made of a I-III-VI compound semiconductor arranged above it, the semiconductor elements (30) protrude from the surface of the support layer on at least one side of the support layer, and the pattern provides that the areas next to a separation line (21) or between several separation lines (21) ~~consisting of~~ comprising conductive elements (20) are fitted with semiconductor elements (30);

~~removal of~~ removing parts of the semiconductor elements (30) on one side of the support layer (10) until the back contact layer of the semiconductor elements (30) is exposed;

~~application of~~ applying a conductive back contact layer (50) onto the side of the support layer (10) on which parts of the semiconductor elements (30) have been removed;

/M.B./ 03/29/2010

~~• application of~~ applying a conductive front contact layer (40) onto the side of the support layer (10) on which no semiconductor elements have been removed, whereby before and/or after ~~the deposition of~~ applying the front contact layer (40) and/or of the back contact layer (50), depositing a buffer layer made of CdS and/or a layer made of intrinsic zinc oxide ~~are deposited~~, or a buffer layer made of CdS and/or a layer made of intrinsic zinc oxide had already been deposited onto the spherical or grain-shaped semiconductor elements (30) employed;

[[•]] ~~making of~~ two separation cuts (60; 61) along a separation line (21) ~~consisting of comprising~~ conductive elements (20), whereby, including making a first separation cut (60) ~~is made~~ in the front contact layer (40) and making a second separation cut (61) ~~is made~~ in the back contact layer, the separation cuts ~~are being~~ on different sides of the ~~appertaining~~ separation line (21), and the separation cuts (60; 61) ~~penetrate~~ penetrating the back contact layer (50) all the way to the support layer (10).

2. (Currently Amended) The method according to claim 1, ~~characterized in that~~ wherein the spherical or grain-shaped semiconductor elements (30) ~~have~~ comprise a layer made of transparent conductive oxide (TCO).

3. (Currently Amended) The method according to ~~one or both of the preceding~~ claims claim 1 and 2, ~~characterized in that~~, comprising in addition to removing parts of the semiconductor elements (30), removing parts of the conductive elements (20) ~~are also~~ removed.

4. (Currently Amended) The method according to ~~one or more of the preceding~~ claims claim 1, comprising, characterized in that, in addition to the removal of removing parts of the semiconductor elements (30), removing part of the support layer (10) ~~is removed~~.

5. (Currently Amended) The method according to ~~one or more of the preceding~~ claims claim 1, characterized in that comprising applying the conductive elements (20) and/or the semiconductor elements (30) ~~are applied~~ onto the support layer (10) by means of scattering, dusting and/or printing, ~~after which they are incorporated and thereafter~~ incorporating said conductive elements and/or said semiconductor elements into the support layer.

6. (Currently Amended) The method according to ~~one or more of the preceding~~ claims claim 1, characterized in that comprising incorpoirating several conductive elements (20) in the form of spherical or grain-shaped particles, in the form of strips or in the form of a paste ~~are incorporated~~ into the support layer (10).

7. (Currently Amended) The method according to ~~one or more of the preceding~~ claims claim 1, characterized in that comprising arranging the conductive elements (20) and/or the semiconductor elements (30) ~~are arranged~~ into a pattern using an auxiliary means and placing the elements (20; 30) ~~are placed~~ onto and/or into the support layer using the auxiliary means.

8. (Currently Amended) The method according to ~~one or more of the preceding~~ claims claim 1, characterized in that wherein the support layer (10) is a matrix with recesses into which the elements (20; 30) are incorporated.

9. (Currently Amended) The method according to ~~one or more of the preceding~~ claims claim 1, ~~characterized in that comprising incorporating the~~ elements (20; 30) ~~are incorporated~~ into the support layer (10) by means of a heating and/or pressing procedure.

10. (Currently Amended) The method according to ~~one or more of the preceding~~ claims claim 1, ~~characterized in that wherein a separation line (21) consisting of comprising~~ conductive elements (20) extends between two edges of the support layer (10) that are opposite from each other.

11. (Currently Amended) The method according to ~~one or more of the preceding~~ claims claim 1, ~~characterized in that the removal of comprising removing the~~ elements (20; 30) ~~and/or of the support layer (10) is done by means of~~ grinding, polishing, etching, thermal energy input and/or by photolithographic processes.

12. (Currently Amended) The method according to ~~one or more of the preceding~~ claims claim 1, ~~characterized in that comprising applying the back contact layer (50) and the front contact layer (40) are deposited by a method selected from the group consisting of~~ PVD methods, CVD methods ~~or~~ and other methods that have been adapted to the type of the layer in question.

13. (Currently Amended) The method according to ~~one or more of the preceding~~ claims claim 1, ~~characterized in that claim 1, comprising making the separation cuts (60; 61) are made using a methods such as method selected from the group consisting of~~ cutting, scoring, etching, thermal energy input or by photolithographic processes.

14. (Currently Amended) The method according to ~~one or more of the preceding claims claim 1, characterized in that~~ wherein the width of a separation line (21) is in the order of magnitude of $B = 10\ \mu\text{m}$ to 3 mm, ~~especially between 10 μm and 500 μm .~~

15. (Currently Amended) The method according to ~~one or more of the preceding claims claim 1, characterized in that~~ wherein the distance between two separation lines (21) is in the order of magnitude of 1 mm to 3 cm, ~~especially between 3 mm and 5 mm.~~

16. (Currently Amended) A serial connection of solar cells having integrated semiconductor elements, ~~characterized in that~~ wherein the serial connection has at least the following features comprising:

[[•]] an insulating support layer (10) into which one or more conductive elements (20) are incorporated ~~according to~~ in a pattern, ~~whereby~~ wherein the conductive elements (20) protrude from the surface of the support layer on at least one side of the support layer, and the pattern ~~calls for~~ defines at least one separation line (21) having a width B and ~~consisting of~~ comprising at least one or more conductive elements (20) element;

~~several~~ a plurality of spherical or grain-shaped semiconductor elements (30) in the insulating support layer (10), ~~whereby~~ wherein the semiconductor elements (30) ~~consist of~~ comprise a substrate core that is coated at least with one conductive back contact layer made of molybdenum and with one semiconductor layer made of a I-III-VI compound semiconductor, and the semiconductor elements (30) protrude from the surface of the support layer on at least one side of the support layer and form a pattern in which the areas next to a separation line (21) or between several separation lines (21) are fitted with semiconductor elements (30);

[[•]] a conductive front contact layer (40) on one side of the support layer (10) on which the elements (20; 30) protrude from the layer;

[[•]] a conductive back contact layer (50) on the side of the support layer that is opposite from the front contact layer (40);

[[•]] a buffer layer made of CdS and/or a layer made of intrinsic zinc oxide, or a buffer layer made of CdS and/or a layer made of intrinsic zinc oxide already on the spherical or grain-shaped semiconductor elements (30) employed;

[[•]] in each case, two separation cuts (60; 61) along a row of conductor elements (20), whereby wherein a first separation cut (60) is made in the front contact layer (40) and a second separation cut (61) is made in the back contact layer, the separation cuts ~~are~~ being on different sides of the ~~appertaining~~ row of conductive elements (20), and the separation cuts (60; 61) penetrate the back contact layer (50) all the way to the support layer (10); and

[[•]] on the side of the support layer (10) on which the back contact layer (50) of the solar cell is arranged, at least one of the semiconductor elements (30) has a surface via which a direct contact is established between the back contact layer (50) of the solar cell and the back contact layer of the semiconductor element (30).

17. (Currently Amended) A serial connection according to claim 16, ~~characterized in that~~ wherein the support layer (10) ~~consists of~~ comprises a thermoplastic material.

18. (Currently Amended) The serial connection according to ~~one or both of claims~~ claim 16 and 17, ~~characterized in that~~ wherein the support layer (10) ~~consists of~~ comprises a polymer selected from the group ~~comprising~~ consisting of epoxides, polyurethanes, polyacrylics, polycarbonates, polyesters ~~and/or, and~~ and polyimides.

19. (Currently Amended) The serial connection according to ~~one or more of~~ claims claim 16 to 18, ~~characterized in that~~ wherein a conductive element (20) is formed by a paste or by a strip.

20. (Currently Amended) The serial connection according to ~~one or more of~~ claims claim 16 to 19, ~~characterized in that~~ wherein a conductive element (20) is formed by a spherical or grain-shaped particle.

21. (Currently Amended) The serial connection according to claim 20, ~~characterized in that~~ wherein a conductive element (20) ~~is made of~~ comprises a conductive material in the form of a solid material, or a ~~conductive element (20) consists of~~ a substrate core that is coated with a conductive material.

22. (Currently Amended) The serial connection according to claim 21, ~~characterized in that~~ wherein a conductive element (20) ~~is made of~~ comprising copper in the form of a solid material or of a substrate core that is coated with copper.

23. (Currently Amended) The serial connection according to ~~one or more of~~ claims claim 16 to 22, ~~characterized in that~~ wherein the semiconductor elements (30) ~~have~~ comprises a layer made of transparent conductive oxide (TCO).

24. (Currently Amended) The serial connection according to ~~one or more of~~ claims claim 16 to 23, ~~characterized in that~~ wherein the separation line (21) ~~consisting of~~ comprises conductive elements (20) is essentially straight and ~~[[it]]~~ extends between two edges of the support layer (10) that are opposite from each other.

25. (Currently Amended) The serial connection according to ~~one or more of~~ claims claim 16 to 24, ~~characterized in that~~ wherein the width of a separation line (21) is in the order of magnitude of $B = 10\ \mu\text{m}$ to 3 mm, ~~especially between 10 μm and 500 μm .~~

26. (Currently Amended) The serial connection according to ~~one or more of~~ claims claim 16 to 25, ~~characterized in that~~ wherein the distance between two separation lines (21) is in the order of magnitude of 1 mm to 3 cm, ~~especially between 3 mm and 5 mm.~~

27. (Currently Amended) The serial connection according to ~~one or more of~~ claims claim 16 to 26, ~~characterized in that~~ wherein the front contact layer (40) is made of comprises a conductive material.

28. (Currently Amended) The serial connection according to claim 27, ~~characterized in that~~ wherein the front contact layer (40) ~~is made of~~ comprises a transparent conductive oxide (TCO).

29. (Currently Amended) The serial connection according to ~~one or more of~~ claims claim 16 to 28, ~~characterized in that~~ wherein the back contact layer (50) ~~is made of~~ comprises a metal, ~~[[of]]~~ a transparent conductive oxide (TCO) or ~~[[of]]~~ a conductive polymer.

30. (Currently Amended) The serial connection according to claim 29, ~~characterized in that~~ wherein the back contact layer (50) ~~consists of~~ comprises a polymer selected from the group ~~comprising the~~ consisting of epoxy resins, polyurethanes ~~and/or, and~~

polyimides having conductive particles ~~[[of a]]~~ selected from the group comprising consisting
of carbon, indium, nickel, silver, molybdenum, iron, nickel chromium, aluminum and/or the
and corresponding alloys or oxides.

31. (Currently Amended) The serial connection according to claim 30,
~~characterized in that~~ wherein the back contact layer (50) ~~consists of~~ comprises an intrinsic
conductive polymer.

32. (Currently Amended) The serial connection according to ~~one or more of~~
~~claims claim~~ 16 to 31, ~~characterized in that~~ wherein the separation cuts (60; 61) are filled up
with an insulating material.

33. (Currently Amended) The serial connection according to ~~one or more of~~
~~claims claim~~ 16 to 32, ~~characterized in that~~ wherein the serial connection is strip-like.

34. (Currently Amended) The serial connection according to ~~one or more of~~
~~claims claim~~ 16 to 33, ~~characterized in that~~ wherein the width of the serial connection is in
the order of magnitude of 5 cm to 30 cm, ~~especially approximately 10 cm.~~

35. (Currently Amended) The serial connection according to ~~one or more of~~
~~claims claim~~ 16 to 34, ~~characterized in that~~ wherein the serial connection is joined to another
serial connection in such a way that the back contact layer (50) is in contact with a front
contact layer of the other serial connection.

/M.B./ 03/29/2010

36. (Currently Amended) The serial connection according to claim 35, ~~characterized in that~~ wherein the serial connection is joined to at least another serial connection in a shingle-like configuration, whereby the back contact layer (50) lies on a front contact layer or else the front contact layer (40) lies on a back contact layer of the other serial connection.

37. (Currently Amended) The serial connection according to ~~one or both of claims claim 35 to 36~~, ~~characterized in that~~ wherein the back contact layer (50) is joined by means of a conductive adhesive to a front contact layer of the other serial connection.

38. (Currently Amended) A photovoltaic module, characterized in that it comprises a serial connection according to ~~one or more of claims claim 16 to 37~~.

39. (New) The method according to claim 1, wherein the width of a separation line is in the order of magnitude of $B =$ between $10\ \mu\text{m}$ and $500\ \mu\text{m}$.

40. (New) The method according to claim 1, wherein the distance between two separation lines is in the order of magnitude of between 3 mm and 5 mm.

41. (New) The serial connection according to claim 16, wherein the width of a separation line is in the order of magnitude of $B =$ between $10\ \mu\text{m}$ and $500\ \mu\text{m}$.

42. (New) The serial connection according to claim 16, wherein the distance between two separation lines is in the order of magnitude of between 3 mm and 5 mm.

/M.B./ 03/29/2010

43. (New) The serial connection according to claim 16, wherein the width of the serial connection is in the order of magnitude of 5 cm to 30 cm, especially approximately 10 cm. (JPZ was not sure about this one)

44 43. (New) The serial connection according to claim 36, wherein the back contact layer is joined by a conductive adhesive to a front contact layer of the other serial connection.